

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1-26. **Canceled**

27. **(Currently amended)** An apparatus for producing assembled polypeptides, said apparatus comprising a reaction vessel containing as components:
- (a) a solid phase support support, having bound thereto a plurality of first peptides, said first peptides comprising partially or completely unprotected peptide peptides having an N-terminus that is bound to said solid phase support via a cleavable handle, and a C-terminus that comprises and a thioacid or a thioester ~~of the formula  $\text{COSR}$  at its C-terminus, wherein said partially or completely unprotected peptide is bound to said solid support via a linker; wherein said linker comprises a cleavable moiety and said partially or completely unprotected first peptide segment is bound to said linker at said N-terminus, and wherein R is a straight or branched  $\text{C}_{1-15}$ -functionalized alkyl group, a  $\text{C}_{1-15}$ -aromatic structure, or 1 to 4 amino acids or derivatives thereof;~~
  - (b) a set plurality of second peptides comprising partially or completely unprotected peptides, each comprising a peptides having an N-terminal cysteine and a C-terminal thioester or a thioacid ~~at its C-terminus and a cysteine residue at its N-terminus; wherein the N-terminal cysteine of said second peptide segment is capable of selectively ligating to the C-terminus of said solid phase bound first peptide to form a solid phase-bound peptide comprising a thioacid at its C-terminus; and one or more sets of different partially or completely unprotected peptides,~~

~~each comprising a thioester or a thioacid at its C-terminus and a  
cysteine residue at its N-terminus, wherein each of the members of each  
set have the same number of amino acids.~~

28. **Canceled**

29. **(Currently amended)** The apparatus of claim 27, wherein the C-terminus of said first peptides ~~partially or completely unprotected peptides (a)~~ comprises a thioacid.

30. **(Currently amended)** The apparatus of claim 27, wherein the C-terminus of said first peptides ~~partially or completely unprotected peptide~~ comprises ~~said a~~ thioester of formula COSR.

31. **(Currently amended)** The apparatus of claim 27, wherein the C-terminus of said second peptides ~~partially or completely unprotected peptide~~ comprises a thioacid.

32. **(Currently amended)** The apparatus of claim 27, wherein the C-terminus of said second peptides ~~partially or completely unprotected peptide~~ comprises ~~said a~~ thioester of formula COSR.

33. **Canceled**

34. **Canceled**

35. **Canceled**

36. **(Currently amended)** The apparatus of claim 27, wherein said solid phase support is a bead resin.

37. **(Currently amended)** The apparatus of claim 27, wherein said ~~first~~, first peptides ~~and said~~ second peptides ~~and third peptide segments~~ range in size from 5 to 99 amino acid residues.
38. **(Currently amended)** The apparatus of claim 27, wherein said first peptides and said second peptides are ~~, second and third peptide segments are all~~ prepared by solid phase synthesis.
39. **Canceled**
40. **(Currently amended)** The apparatus of claim 27, wherein at least one of said ~~peptide segments (a), (b) or (c)~~ plurality of first peptides and said plurality of second peptides comprises peptides having an unnatural backbone structure.
41. **(Currently amended)** An apparatus for preparing assembled polypeptides, said apparatus comprising a reaction vessel containing as components:
- a) a solid phase support having bound thereto a plurality of first peptides, said first peptides comprising partially or completely unprotected first peptide segment comprising an N-terminus and a C-terminus, wherein said peptide peptides having a C-terminus that is bound to said solid phase support via a cleavable linkage between C-terminus and said support, and wherein said and an N-terminus is that comprises a cysteine residue;
  - b) a set plurality of second peptides comprising partially or completely unprotected peptides having an N-terminal cysteine and a C-terminal thioacid or thioester, each comprising a thioester of formula COSR or a thioacid at its C-terminus and a cysteine residue at its N-terminus; wherein the N-terminal cysteine of said solid phase bound first peptide segment is capable of selectively ligating to the C-terminus of said second peptide to form a solid phase bound peptide comprising a cysteine at its N-terminus; wherein R is a straight or branched C<sub>1-15</sub>

~~functionalized alkyl group, a C<sub>1-15</sub> aromatic structure, or 1 to 4 amino acids or derivatives thereof; and~~  
~~e) — one or more sets of different partially or completely unprotected peptide segments, each comprising a thioester or a thioacid at its C-terminus and a cysteine residue at its N-terminus, wherein each of the members of each set have the same number of amino acids. --~~

42. (Currently amended) The apparatus of claim 41, wherein said ~~set~~ plurality of second peptides ~~unprotected peptide segments~~ is comprised of peptides having the same length, but different amino acid sequences.
43. (Currently amended) The apparatus of claim 41, wherein said ~~set~~ plurality of second ~~unprotected~~ peptides consists essentially of identical peptides.
44. Canceled
45. (Currently amended) The apparatus of claim 41, wherein the C-terminus of said first ~~partially or completely unprotected~~ peptides (~~a~~) comprises a thioacid.
46. (Currently amended) The apparatus of claim 41, wherein the C-terminus of said first ~~partially or completely unprotected~~ peptides (~~a~~) comprises ~~said a~~ a thioester of formula COSR.
47. (Currently amended) The apparatus of claim 41, wherein the C-terminus of said second ~~partially or completely unprotected~~ peptides (~~b~~) comprises a thioacid.
48. (Currently amended) The apparatus of claim 41, wherein the C-terminus of said second ~~partially or completely unprotected~~ peptides (~~b~~) comprises ~~said a~~ a thioester of formula COSR.
49. Canceled

50. **Canceled**
51. **Canceled**
52. **(Currently amended)** The apparatus of claim 41, wherein said solid phase support is a bead resin.
53. **(Currently amended)** The apparatus of claim 41, wherein said first peptides and said second peptides, ~~second and third peptide segments~~ range in size from 5 to 99 amino acid residues.
54. **(Currently amended)** The apparatus of claim 41, wherein said first peptides and said second peptides are ~~, second and third peptide segments are all~~ prepared by solid phase synthesis.
55. **Canceled**
56. The apparatus of claim 41, wherein at least one of said ~~peptide segments (a), (b) or (c)~~ plurality of first peptides and said plurality of second peptides comprises peptides having an unnatural backbone structure.
57. **(New)** An apparatus for producing assembled polypeptides, said apparatus comprising a reaction vessel containing as components:
- (a) an aqueous solution comprising a solid phase support, said solid phase support having bound thereto a plurality of first peptides comprising partially or completely unprotected peptides having (i) an N-terminus that is bound to said solid phase support via a cleavable handle, and (ii) a C-terminus that is unprotected and capable of chemoselective chemical ligation; and
  - (b) a plurality of second peptides comprising partially or completely unprotected peptides having an N-terminus that is (i) unprotected and (ii)

capable of chemoselective ligation in said aqueous solution to said C-terminus of said first peptides.